

REMARKS

This application has been reviewed in light of the Office Action dated June 30, 2005. Newly added Claims 20-26 are presented for examination, of which Claims 20, 23, 24 and 26 are in independent form. Claims 1-10 and 19 have been cancelled, without prejudice or disclaimer of subject matter. Favorable reconsideration is requested.

In the outstanding Office Action, Claims 1-10 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,943,094 (*Sakai et al.*) in view of U.S. Patent 6,133,862 (*Dhuse et al.*), and Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sakai* in view of *Dhuse* and of U.S. Patent 6,154,253 (*Kiri et al.*).

The newly added claims are believed to be clearly allowable over the prior art, for at least the following reasons.

Independent Claim 20 is directed to an image processing apparatus that comprises a read-out unit reading out a photoelectric conversion signal accumulated in a pixel for a first accumulation duration, the photoelectric conversion signal including a first noise component. Also provided is an operation unit operating correction value corresponding to the first noise component on the basis of a correction value corresponding to a second noise component accumulated in the pixel for a second accumulation duration, a correction value corresponding to a third noise component accumulated in the pixel for a third accumulation duration, and information on the first accumulation duration. A correction unit corrects the photoelectric conversion signal using the correction value corresponding to the first noise component.

Among other notable features of the apparatus of Claim 20, are that there are calculated (1) a correction value corresponding to a first noise component included in a

photoelectric conversion signal accumulated in a pixel for a first accumulation duration, on the basis of a correction value corresponding to a second noise component (e.g., fixed pattern noise) accumulated in the pixel for a second accumulation duration, and (2) a correction value corresponding to a third noise component (e.g., dark current) accumulated in the pixel for a third accumulation duration, and information on the first accumulation duration, and that the photoelectric conversion signal is corrected using the calculated correction value corresponding to the first noise component. In this connection, it should be noted that in this claim, and the other newly added claims, the term "duration" is used, in order to recite that the accumulation periods have the same length of time, but without specifying their respective start timings.

Sakai relates to an image pickup device in which an average value of noise signals read out from a light-shielded pixel processed a plurality of times (different accumulation periods having the same length). Applicant submits, however, that nothing in *Sakai* would teach or suggest different accumulation durations of noise components relating to correction value calculation, and therefore fails to teach the operation unit recited in Claim 20.

Dhuse relates to a technique of reducing row-reset noise in a photodiode, in which a noise correction value is calculated using reset noise signals read out after reset at different respective timings (e.g., Fig.6). Applicant submits that this patent also is silent on the idea of using different accumulation durations of noise components to calculate a noise correction value, and thus also fails to teach the operation unit of Claim 20.

Moreover, even if combined in the proposed manner with *Sakai*, and even assuming for argument's sake that such combination would be a proper one, the result would not meet the terms of Claim 20. Applicant believes, however, that the proposed combination would

in fact not have been obvious to one of merely ordinary skill in the art. Applicant notes that *Dhuse* relates to a technique for reducing noise from an image pickup unit, in which two dark “exposures” (accumulations of charge without incident light) are made, separated a reset (an earlier reset precedes the first accumulation). These two readings are used to form a correction signal that is employed to reduce noise in the image signal. *Sakai*, however, expresses the view that it is disadvantageous to use a correction signal obtained at about the same time that an image is taken, because this approach interferes with the speeds attainable in continuous-mode operation of a camera (col. 1, lines 25-30). This concern also seems to indicate a need to avoid unnecessary steps in the generation of a corrective signal, as such steps would tend to reduce the attainable continuous-mode speed. Applicant considers that the performance of the two resets that are necessary in the *Dhuse* approach would constitute such a delay, and that for at least that reason, it would have been unobvious for a person of only ordinary skill to try to apply the *Dhuse* approach in the *Sakai* apparatus.

Accordingly, Claim 20 is believed to be clearly allowable over these two documents, taken separately or in any proper combination (if any).

Independent Claim 23 is directed to an image processing apparatus that comprises a read-out unit that reads out a photoelectric conversion signal accumulated in a pixel for a first accumulation duration, the photoelectric conversion signal including a first noise component. An operation unit operates a correction value corresponding to the first noise component on the basis of a correction value corresponding to fixed pattern noise of a plurality of the pixels, a correction value corresponding to a second noise component accumulated in the pixel for a second accumulation duration, and information on the first accumulation duration. A correction unit is

provided, to correct the photoelectric conversion signal using the correction value corresponding to the first noise component.

Claim 23 is believed to be clearly allowable over *Sakai* and *Dhuse* for at least the same reasons as is Claim 20.

Each of the other independent claims contains recitations similar to those of Claim 20 with respect to the arguments presented above with regard to the latter claim, and are therefore believed also to be allowable, at least by virtue of those arguments.

The other claims in this application depend from one or another of the independent claims discussed above and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual consideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "L.P. Diana", is written over a horizontal line.

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